AMENDMENTS TO THE CLAIMS

In response to Office Action, please amend the above-identified patent application as follows:

In the Claims

Claims 29, 39, and 73 have been amended as follows:

1. (original) A method of reducing potential interference in an impulse radio receiver, comprising the steps of:

(a) receiving a signal including an impulse signal, the impulse signal including a sequence of impulses spaced in time from one another;

(b) sampling the sequence of impulses at a sequence of data sample times to produce a sequence of data samples;

(c) sampling the received signal at a time offset from each of the data sample times to produce a nulling sample corresponding to each of the data samples, thereby producing a sequence of nulling samples corresponding to the time offset;

(d) separately combining each of the data samples with a corresponding nulling sample from the sequence of nulling samples to produce a sequence of adjusted samples corresponding to the time offset;

(e) determining a first quality metric associated with the sequence of adjusted samples;

(f) determining a second quality metric associated with the sequence of data samples; and

(g) selecting a preferred sequence of samples based on the first and second quality metrics.

2. (original) The method of claim 1, further comprising the step of:

(h) further signal processing the preferred sequence of samples.

3. (original) The method of claim 1, wherein:

step (e) comprises determining a first amplitude variance associated with the sequence of adjusted samples, wherein the first quality metric includes the first amplitude variance; and

step (f) comprises determining a second amplitude variance associated with the sequence of data samples, wherein the second quality metric includes the second amplitude variance.

4. (original) The method of claim 3, wherein:

step (f) comprises selecting as the preferred sequence of samples the sequence of data samples if the first amplitude variance is less than the second amplitude variance, otherwise selecting the sequence of adjusted data samples.

5. (original) The method of claim 3, wherein:

step (e) comprises determining the first amplitude variance by determining an amplitude variance of the sequence of adjusted samples; and

step (f) comprises determining the second amplitude variance by determining an amplitude variance of the sequence of data samples.

6. (original) The method of claim 3, wherein:

step (e) comprises

(e.1) accumulating N adjusted samples of the sequence of adjusted samples to produce an accumulated adjusted sample, wherein N is an integer greater than one,

(e.2) repeating step (e.1) to produce a group of accumulated adjusted samples, and

(e.3) determining the first amplitude variance by determining an amplitude variance of the group of accumulated adjusted samples;

step (f) comprises

(f.1) accumulating N data samples of the plurality of data samples to produce an accumulated data sample,

(f.2) repeating step (f.1) to produce a group of accumulated data samples, and

(f.3) determining the second amplitude variance by determining an amplitude variance of the group of accumulated data samples; and

step (g) comprises

selecting as the preferred sequence of samples either the group of accumulated adjusted samples or the group of accumulated data samples based on the first and second amplitude variances.

7. (original) The method of claim 1, wherein the time offset is associated with a nulling frequency f_0, which can be an ensemble of frequencies.

8. (original) The method of claim 1, wherein the sampling of the received signal at the time offsets in step (c) comprises sampling the impulse signal so as to avoid sampling the impulse signal.

9. (original) The method of claim 1, wherein:

step (b) comprises

(b.1) producing a data sampling control signal, and

(b.2) sampling the sequence of impulses based on the data sampling control signal; and

step (c) comprises

(c.1) producing a nulling sampling control signal based on the data sampling control signal, and

(c.2) sampling the received signal based on the nulling sampling control signal.

10. (original) The method of claim 1, wherein at least a portion of the nulling samples produced at step (c) are weighted according to one or more weighting factors.

11. (original) A method of reducing potential interference in an impulse radio receiver, comprising the steps of:

(a) receiving a signal including an impulse signal, the impulse signal including a sequence of impulses;

(b) sampling the sequence of impulses at a sequence of data sample times to produce a sequence of data samples;

(c) sampling the received signal at a plurality of time offsets from each of the data sample times to produce a plurality of nulling samples corresponding to each of the data samples, thereby producing a separate sequence of nulling samples for each of the time offsets;

(d) separately combining each of the data samples with a corresponding nulling sample from each of the separate sequences of nulling samples to produce a separate sequence of adjusted samples corresponding to each of the time offsets;

(e) determining a separate quality metric for each of the separate sequences of adjusted samples;

(f) determining a quality metric for the sequence of data samples; and

(g) selecting a preferred sequence of samples based on the quality metrics determined at steps (e) and (f).

12. (original) The method of claim 11, further comprising the step of:

(h) further signal processing the preferred sequence of samples.

13. (original) The method of claim 11, wherein the quality metrics are measures of amplitude variance, and wherein:

step (e) comprises determining a separate amplitude variance associated with each separate sequence of adjusted samples; and

step (f) comprises determining an amplitude variance associated with the sequence of data samples.

14. (original) The method of claim 13, wherein:

step (g) comprises selecting as the preferred sequence of samples a sequence associated with a lowest amplitude variance.

15. (original) The method of claim 13, wherein:

step (e) comprises determining the separate amplitude variance associated with each separate sequence of adjusted samples by determining an amplitude variance of each separate sequence of adjusted samples; and

step (f) comprises determining the amplitude variance associated with the sequence of data samples by determining an amplitude variance of the sequence of data samples.

16. (original) The method of claim 13, wherein:

step (e) comprises, for each separate sequence of adjusted samples,

(e.1) accumulating N adjusted samples of the sequence of adjusted samples to produce an accumulated adjusted sample, wherein N is an integer greater than one;

(e.2) repeating step (e.1) to produce a group of accumulated adjusted samples; and

(e.3) determining the amplitude variance associated with the sequence of adjusted samples by determining an amplitude variance of the group of accumulated adjusted samples,

thereby determining a plurality of amplitude variances, each associated with a group of accumulated adjusted samples and a respective one of the time offsets of step (c);

step (f) comprises

(f.1) accumulating N data samples of the plurality of data samples to produce an accumulated data sample;

(f.2) repeating step (f.1) to produce a group of accumulated data samples; and

(f.3) determining the amplitude variance associated with the sequence of data samples by determining an amplitude variance of the group of accumulated data samples; and

step (g) comprises

selecting as the preferred sequence of samples one of the groups of accumulated adjusted samples or the group of accumulated data samples based on the variances determined at steps (e) and (f).

17. (original) The method of claim 11, wherein each of the plurality of time offsets is associated with a separate nulling frequency f_0, which can be an ensemble of frequencies.

18. (original) The method of claim 11, wherein the sampling of the received signal at the plurality of time offsets of step (c) comprises sampling the impulse signal so as to avoid sampling the impulse signal.

19. (original) The method of claim 11, wherein:

step (b) comprises

(b.1) producing a data sampling control signal, and

(b.2) sampling the sequence of impulses based on the data sampling control signal; and

step (c) comprises

(c.1) producing a plurality of nulling sampling control signals based on the data sampling control signal, and

(c.2) sampling the received signal based on the plurality of nulling sampling control signals.

20. (original) The method of claim 11, wherein at least a portion of the nulling samples produced at step (c) are weighted according to one or more weighting factors.

21. (original) A method of processing a received signal including an impulse signal and potential interference in an impulse radio receiver, including the steps of:

(a) receiving a signal including an impulse signal, the impulse signal including a sequence of impulses;

(b) sampling the sequence of impulses at a sequence of data sample times to produce a sequence of data samples;

(c) sampling the received signal at a plurality of time offsets from each of the data sample times to produce a plurality of nulling samples corresponding to each of the data samples, thereby producing a separate sequence of nulling samples for each of the time offsets;

(d) separately combining each of the data samples with a corresponding nulling sample from each of the separate sequences of nulling samples to produce a separate sequence of adjusted samples corresponding to each of the time offsets;

(e) determining a separate quality metric for each of the separate sequences of adjusted samples; and

(f) selecting a preferred sequence of samples based on the quality metrics determined at step (e).

22. (original) The method of claim 21, further comprising the step of:

(g) further signal processing the preferred sequence of samples.

23. (original) The method of claim 21, wherein the quality metrics are measures of amplitude variance, and wherein:

step (e) comprises determining a separate amplitude variance associated with each separate sequence of adjusted samples.

24. (original) The method of claim 23, wherein:

step (f) comprises selecting as the preferred sequence a sequence associated with a lowest amplitude variance.

25. (original) The method of claim 23, wherein:

step (e) comprises determining the separate amplitude variance associated with each separate sequence of adjusted samples by determining the amplitude variance of each separate sequence of adjusted samples.

26. (original) The method of claim 23, wherein:

step (e) comprises, for each separate sequence of adjusted samples,

(e.1) accumulating N adjusted samples of the sequence of adjusted samples to produce an accumulated adjusted sample, wherein N is an integer greater than one;

(e.2) repeating step (e.1) to produce a group of accumulated adjusted samples; and

(e.3) determining the amplitude variance associated with the sequence of adjusted samples by determining an amplitude variance of the group of accumulated adjusted samples,

thereby determining a plurality of amplitude variances, each associated with a group of accumulated adjusted samples and a respective one of the time offsets of step (c); and

step (f) comprises

selecting as the preferred sequence of samples one of the groups accumulated adjusted samples based on the quality metrics determined at step (e).

27. (original) The method of claim 21, wherein each of the plurality of time offsets is associated with a separate nulling frequency f_0, which can be an ensemble of frequencies.

28. (original) The method of claim 21, wherein the sampling of the received signal at the plurality of time offsets of step (c) comprises sampling the impulse signal so as to avoid sampling the impulse signal.

29. (currently amended) The method of claim 21, wherein:

step (b) comprises

(b.1) producing a data sampling control signal, and

(b.2) sampling the sequence of impulses based on the data sampling control signal; and

step (c) comprises

(~~b~~c.1) producing a plurality of nulling sampling control signals based on the data sampling control signal, and

(~~b~~c.2) sampling the received signal based on the plurality of nulling sampling control signals.

30. (original) The method of claim 21, wherein at least a portion of the nulling samples produced at step (c) are weighted according to one or more weighting factors.

31. (original) A method of reducing potential interference in an impulse radio receiver, comprising the steps of:

(a) receiving a signal including an impulse signal, the impulse signal including a sequence of impulses spaced in time from one another;

(b) sampling the sequence of impulses at a sequence of data sample times to produce a sequence of data samples;

(c) sampling the received signal at a time offset from each of the data sample times to produce a nulling sample corresponding to each of the data samples, thereby producing a sequence of nulling samples corresponding to the time offset;

(d) separately combining each of the data samples with a corresponding nulling sample from the sequence of nulling samples to produce a sequence of adjusted samples corresponding to the time offset; and

(e) further signal processing the sequence of adjusted samples.

32. (original) A method of reducing potential interference in an impulse radio receiver, comprising the steps of:

(a) receiving a signal including an impulse signal, the impulse signal including a sequence of impulses spaced in time from one another;

(b) sampling the sequence of impulses at a sequence of data sample times to produce a sequence of data samples;

(c) accumulating N data samples of the plurality of data samples to produce an accumulated data sample, wherein N is an integer greater than one;

(d) sampling the received signal at a time offset from each of the data sample times to produce a nulling sample corresponding to each of the data samples, thereby producing a sequence of nulling samples corresponding to the time offset;

(e) accumulating N nulling samples of the sequence of nulling samples to produce an accumulated nulling sample;

(f) combining the accumulated data sample with the accumulated nulling sample to produce an adjusted accumulated sample;

(g) repeating steps (c) through (f) a plurality of times to produce a plurality of accumulated data samples and a plurality of adjusted accumulated samples;

(h) determining a first quality metric associated with the plurality of adjusted accumulated samples;

(i) determining a second quality metric associated with the plurality of accumulated data samples; and

(j) selecting for further signal processing, based on the first and second quality metrics, either the plurality of adjusted accumulated samples or the plurality of accumulated data samples.

33. (original) In an impulse radio receiver adapted to cancel potential interference from data samples by combining nulling samples with the data samples, wherein a time offset exists between each data sample and a corresponding nulling sample, a method for improving an impulse signal-to-interference ratio, comprising the steps of

(a) receiving a signal including an impulse signal, the impulse signal including a sequence of impulses;

(b) searching for a preferred time offset at which to produce nulling samples; and

(c) reducing interference by combining data samples with nulling samples produced using the preferred time offset.

34. (original) The method of claim 33, wherein:

step (b) comprises:

(b.1) sampling the sequence of impulses at a sequence of data sample times to produce a sequence of data samples;

(b.2) sampling the received signal at a plurality of time offsets from each of the data sample times to produce a plurality of nulling samples corresponding to each of the data samples, thereby producing a separate sequence of nulling samples for each of the time offsets;

(b.3) separately combining each of the data samples with a corresponding nulling sample from each of the separate sequences of nulling samples to produce a separate sequence of adjusted samples corresponding to each of the time offsets;

(b.4) determining a separate quality metric for each of the separate sequences of adjusted samples; and

(b.5) selecting one of the plurality of time offsets as the preferred time offset based on the quality metrics determined at step (b.4).

35. (original) The method of claim 34, where step (c) comprises:

(c.1) receiving a further signal including a further impulse signal, the further impulse signal including a further sequence of impulses;

(c.2) sampling the received signal at a plurality of further data sampling times t_{DS};

(c.3) sampling the received signal at the preferred time offset from each of the further data sample times to produce a nulling sample corresponding each of the further data samples; and

(c.4) separately combining each of the further data samples with the corresponding nulling sample to produce a further sequence of adjusted samples.

36. (original) The method of claim 33, wherein step (b) comprises:

(b.1) sampling the train of impulses at a sequence of data sample times to produce a sequence of data samples;

(b.2) sampling the received signal at a time offset from each of the data sample times to produce a nulling sample corresponding to each of the data samples, thereby producing a sequence of nulling samples associated with the time offset;

(b.3) separately combining each of the data samples with the corresponding nulling sample to produce a sequence of adjusted samples corresponding to the time offset;

(b.4) determining a quality metric for the sequence of adjusted samples, the quality metric associated with the time offset;

(b.5) repeating steps (b.1) through (b.4) over time for a plurality of different time offsets, thereby determining a quality metric associated with each of the plurality of different time offsets; and

(b.6) selecting one of the plurality of different time offsets as the preferred time offset based on the quality metrics determined at step (b.4).

37. (original) The method of claim 36. where step (c) comprises:

(c.1) receiving a further signal including a further impulse signal, the further impulse signal including a further sequence of impulses;

(c.2) sampling the further impulse signal at a plurality of further data sampling times t_{DS};

(c.3) sampling the received signal at the preferred time offset from each of the further data sample times to produce a nulling sample corresponding each of the further data samples; and

(c.4) separately combining each of the further data samples with the corresponding nulling sample to produce a further sequence of adjusted samples.

38. (original) In an impulse radio receiver adapted to cancel potential interference from data samples by combining nulling samples with the data samples, wherein a time offset exists between each data sample and a corresponding nulling sample, a method for improving an impulse signal-to-interference ratio, comprising the steps of:

(a) receiving a signal;

(b) searching for a preferred time offset at which to produce nulling samples; and

(c) reducing interference by combining data samples with nulling samples produced using the preferred time offset,

wherein steps (a) and (b) are performed prior to receiving a further signal that includes an impulse signal.

39. (currently amended) The method of claim 38, wherein:

step (b) comprises:

(b.1) sampling the received signal at a sequence of sample times to produce a sequence of samples;

(b.2) sampling the received signal at a plurality of time offsets from each of the sample times to produce a plurality of nulling samples corresponding to each of the samples, thereby producing a separate sequence of nulling samples for each of the time offsets;

(b.3) separately combining each of the samples with a corresponding nulling sample from each of the separate sequences of nulling samples to produce a separate sequence of adjusted samples corresponding to each of the time offsets;

(b.4) determining a separate quality metric for each of the separatee sequences of adjusted samples; and

(b.5) selecting one of the plurality of time offsets as the preferred time offset based on the quality metrics determined at step (b.4).

40. (original) The method of claim 39, where step (c) comprises:

(c.1) receiving the further signal including the impulse signal, the impulse signal including a sequence of impulses;

(c.2) sampling the impulse signal at a plurality of data sampling times t_{DS};

(c.3) sampling the received signal at the preferred time offset from each of the data sample times to produce a nulling sample corresponding each of the data samples; and

(c.4) separately combining each of the data samples with the corresponding nulling sample to produce a further sequence of adjusted samples.

41. (original) The method of claim 38, wherein step (b) comprises:

(b.1) sampling the received signal at a sequence of sample times to produce a sequence of samples;

(b.2) sampling the received signal at a time offset from each of the sample times to produce a nulling sample corresponding to each of the samples, thereby producing a sequence of nulling samples associated with the time offset;

(b.3) separately combining each of the samples with the corresponding nulling sample to produce a sequence of adjusted samples corresponding to the time offset;

(b.4) determining a quality metric for the sequence of adjusted samples, the quality metric associated with the time offset;

(b.5) repeating steps (b.1) through (b.4) over time for a plurality of different time offsets, thereby determining a quality metric associated with each of the plurality of different time offsets; and

(b.6) selecting one of the plurality of different time offsets as the preferred time offset based on the quality metrics determined at step (b.4).

42. (original) The method of claim 41, where step (c) comprises:

(c.1) receiving the further signal including the impulse signal, the impulse signal including a sequence of impulses;

(c.2) sampling the impulse signal at a plurality of data sampling times t_{DS};

(c.3) sampling the received signal at the preferred time offset from each of the data sample times to produce a nulling sample corresponding each of the data samples; and

(c.4) separately combining each of the data samples with the corresponding nulling sample to produce a further sequence of adjusted samples.

43. (original) In an impulse radio receiver adapted to cancel potential interference from data samples by combining nulling samples with the data samples, a method for determining a preferred time offset between each data sample and a corresponding nulling sample, comprising the steps of:

(a) receiving a signal including an impulse signal, the impulse signal including a sequence of impulses;

(b) sampling the sequence of impulses at a sequence of data sample times to produce a sequence of data samples;

(c) sampling the received signal at a plurality of time offsets from each of the data sample times to produce a plurality of nulling samples corresponding to each of the data samples, thereby producing a separate sequence of nulling samples for each of the time offsets;

(d) separately combining each of the data samples with a corresponding nulling sample from each of the separate sequences of nulling samples to produce a separate sequence of adjusted samples corresponding to each of the time offsets;

(e) determining a separate quality metric for each of the separate sequences of adjusted samples; and

(f) selecting one of the plurality of time offsets as the preferred time offset based on the quality metrics determined at step (e).

44. (original) In an impulse radio receiver adapted to cancel potential interference from data samples by combining nulling samples with the data samples, a

method for determining a preferred time offset between each data sample and a corresponding nulling sample, comprising the steps of:

(a) receiving a further signal including an impulse signal, the impulse signal including a train of impulses;

(b) sampling the train of impulses at a sequence of data sample times to produce a sequence of data samples;

(c) sampling the received signal at a time offset from each of the data sample times to produce a nulling sample corresponding to each of the data samples, thereby producing a sequence of nulling samples associated with the time offset;

(d) separately combining each of the data samples with the corresponding nulling sample to produce a sequence of adjusted samples corresponding to the time offset;

(e) determining a quality metric for the sequence of adjusted samples, the quality metric associated with the time offset;

(f) repeating steps (b) through (e) over time for a plurality of different time offsets, thereby determining a quality metric associated with each of the plurality of different time offsets; and

(g) selecting one of the plurality of different time offsets as the preferred time offset based on the quality metrics determined at step (e).

45. (original) In an impulse radio receiver adapted to cancel potential interference from data samples by combining nulling samples with the data samples, a method for determining a preferred time offset between each data sample and a corresponding nulling sample, comprising the steps of:

(a) receiving a signal;

(b) sampling the signal at a sequence of sample times to produce a sequence of samples;

(c) sampling the received signal at a plurality of time offsets from each of the sample times to produce a plurality of nulling samples corresponding to each of the samples, thereby producing a separate sequence of nulling samples for each of the time offsets;

(d) separately combining each of the samples with a corresponding nulling sample from each of the separate sequences of nulling samples to produce a separate sequence of adjusted samples corresponding to each of the time offsets;

(e) determining a separate quality metric for each of the separate sequences of adjusted samples; and

(f) selecting one of the plurality of time offsets as the preferred time offset based on the quality metrics determined at step (e),

wherein steps (a) through (f) are performed prior to receiving a signal that includes an impulse signal.

46. (original) The method of claim 45, further comprising the step of:

(g) receiving a further signal including an impulse signal, the impulse signal including a sequence of impulses;

(h) sampling the impulse signal at a plurality of data sampling times t_{DS};

(i) sampling the received signal at the preferred time offset from each of the data sample times to produce a nulling sample corresponding each of the data samples; and

(j) separately combining each of the data samples with the corresponding nulling sample to produce a further sequence of adjusted samples.

47. (original) In an impulse radio receiver adapted to cancel potential interference from data samples by combining nulling samples with the data samples, a method for determining a preferred time offset between each data sample and a corresponding nulling sample, comprising the steps of:

receiving a signal;

sampling the signal at a sequence of sample times to produce a sequence of samples;

sampling the received signal at a time offset from each of the sample times to produce a nulling sample corresponding to each of the samples, thereby producing a sequence of nulling sample associated with the time offset;

separately combining each of the samples with a corresponding nulling sample to produce a sequence of adjusted samples corresponding to the time offset;

determining a quality metric for the sequences of adjusted samples, the quality metric associated with the time offset;

repeating steps (b) through (e) over time for a plurality of different time offsets, thereby determining a quality metric associated with each of the plurality of different time offsets; and

selecting one of the plurality of different time offsets as the preferred time offset based on the quality metrics determined at step (e),

wherein steps (a) through (g) are performed prior to receiving a signal that includes an impulse signal.

48. (original) The method of claim 47, further comprising the step of:

(h) receiving a further signal including an impulse signal, the impulse signal including a sequence of impulses;

(i) sampling the impulse signal at a plurality of data sampling times t_{DS};

(j) sampling the received signal at the preferred time offset from each of the data sample times to produce a nulling sample corresponding each of the data samples; and

(k) separately combining each of the data samples with the corresponding nulling sample to produce a further sequence of adjusted samples.

49. (original) The method of claim 48, further comprising the step of:

(l) processing the further sequence of adjusted samples.

50. (original) The method of claim 49, wherein step (l) comprises demodulating the further sequence of adjusted samples.

51. (original) An impulse radio receiver subsystem for reducing potential interference, comprising:

a data sampler adapted to sample a received signal at data sampling times to produce a sequence of data samples;

a nulling sampler adapted to sample the received signal at a time offset from each of the data sample times to produce a sequence of nulling samples;

a combiner adapted to separately combine each of the data samples with a corresponding nulling sample from the sequence of nulling samples to produce a sequence of adjusted samples;

a first quality metric generator adapted to determine a first quality metric associated with the sequence of data samples;

a second quality metric generator adapted to determine a second quality metric associated with the sequence of adjusted data samples; and

a selector adapted to select either the sequence of data samples or the sequence of adjusted samples, based on the first and second quality metrics.

52. (original) The receiver subsystem of claim 51, further comprising:

a demodulator to demodulate the sequence selected by the selector.

53. (original) The receiver subsystem of claim 51, wherein:

the first quality metric generator is adapted to determine a first amplitude variance associated with the sequence of adjusted samples, wherein the first quality metric includes the first amplitude variance; and

the second quality metric generator is adapted to determine a second amplitude variance associated with the sequence of data samples, wherein the second quality metric includes the second amplitude variance.

54. (original) The receiver subsystem of claim 53, wherein:

the selector is adapted to select for further signal processing either the sequence of data samples or the sequence of adjusted samples, based on whether the first amplitude variance is less than the second amplitude variance.

55. (original) The receiver subsystem of claim 53, wherein:

the first quality metric generator is adapted to determine the first amplitude variance by determining the amplitude variance of the sequence of adjusted samples; and

the second quality metric generator is adapted to determine the second amplitude variance by determining the amplitude variance of the sequence of data samples.

56. (original) The receiver subsystem of claim 53, further comprising:

a first accumulator adapted to repeatedly accumulate N adjusted samples of the sequence of adjusted samples to produce a group of accumulated adjusted samples, wherein N is an integer greater than one; and

a second accumulator adapted to repeatedly accumulate N data samples of the sequence of data samples to produce a group of accumulated data samples, and

wherein

the first quality metric generator is adapted to determine the first amplitude variance by determining an amplitude variance of the group of accumulated adjusted samples;

the second quality metric generator is adapted to determine the second amplitude variance by determining an amplitude variance of the group of accumulated data samples; and

the selector is adapted to select as the preferred sequence of samples either the group of accumulated adjusted samples or the group of accumulated data samples, based on the first and second amplitude variances.

57. (original) The receiver subsystem of claim 51, wherein the time offset is associated with a nulling frequency f_0, which can be an ensemble of frequencies.

58. (original) The receiver subsystem of claim 51, wherein the received signal includes an impulse signal including a sequence of impulses, and wherein the nulling

sampler is adapted to sample the received signal so as to avoid sampling the impulse signal.

59. (original) The receiver subsystem of claim 51, wherein

the nulling sampler includes a correlator adapted to correlate the received signal in accordance with a first sampling control signal, to produce first correlation results representing the sequence of nulling samples; and

the data sampler includes a correlator adapted to correlate the received signal in accordance with a second sampling control signal, to produce second correlation results representing the sequence of data samples.

60. (original) The receiver subsystem of claim 51, wherein at least a portion of the nulling samples are weighted according to one or more weighting factors.

61. (original) An impulse radio receiver subsystem for reducing potential interference, comprising:

a data sampler adapted to sample a received signal at a sequence of data sample times to produce a sequence of data samples;

a plurality of nulling samplers, wherein each nulling sampler is adapted to sample the received signal at a separate time offset from each of the data sample times to produce a separate sequence of nulling samples for each of the time offsets;

a plurality of combiners, wherein each combiner is adapted to separately combine each of the data samples with a corresponding nulling sample from each of the separate sequences of nulling samples to produce a separate sequence of adjusted samples corresponding to each of the time offsets;

a plurality of quality metric generators, wherein each quality metric generator is adapted to determine separate quality metric associated with one of the separate sequences of adjusted samples; and

a selector adapted to select a preferred sequence of samples, based on the determined quality metrics.

62. (original) The receiver subsystem of claim 61, further comprising:

a further quality metric generator adapted to determine a quality metric associated with the sequence of data samples, and

wherein the preferred sequence of samples selected by the selector is one of the separate sequences of adjusted samples or the sequence of data samples.

63. (original) The receiver subsystem of claim 62, further comprising the step of:

a demodulator to demodulate the preferred sequence of samples.

64. (original) The receiver subsystem of claim 62, wherein:

each of the plurality of quality metric generators is adapted to determine an amplitude variance of one of the separate sequences of adjusted samples; and

the further quality metric generator is adapted to determine an amplitude variance of the sequence of data samples.

65. (original) The receiver subsystem of claim 62, wherein:

each of the plurality of quality metric generators is adapted to determine an amplitude variance associated with one of the separate sequences of adjusted data samples;

the further quality metric generator is adapted to determine an amplitude variance associated with the sequence of data samples; and

the selector is adapted to select the preferred sequence of samples by selecting a sequence associated with a lowest amplitude variance.

66. (original) The receiver subsystem of claim 65, further comprising:

a plurality of accumulators, wherein each accumulator is adapted to repeatedly accumulate N adjusted samples of a separate one of the sequences of adjusted samples to produce a separate group of accumulated adjusted samples, wherein N is an integer greater than one;

a further accumulator adapted to repeatedly accumulate N data samples of the sequence of data samples to produce a group of accumulated data samples, and

wherein

each of the plurality of quality metric generators is adapted to determine an amplitude variance of one of the groups of accumulated adjusted samples;

the further quality metric generator is adapted to determine an amplitude variance of the plurality of accumulated data samples; and

the selector is adapted to select as the preferred sequence of samples one of the groups of accumulated adjusted samples or the group of accumulated data samples.

67. (original) The receiver subsystem of claim 61, wherein each of the plurality of time offsets is associated with a separate nulling frequency f_0, which can be an ensemble of frequencies.

68. (original) The receiver subsystem of claim 61, wherein the received signal includes an impulse signal including a sequence of impulses, and the nulling samplers sample the received signal so as to avoid sampling the impulse signal.

69. (original) The receiver subsystem of claim 61, wherein:

each of the plurality of nulling samplers includes a correlator adapted to correlate the received signal in accordance with a corresponding sampling control signal, to produce corresponding correlation results representing one of the sequences of nulling samples; and

the data sampler includes a correlator adapted to correlate the received signal in accordance with a data sampling control signal, to produce correlation results representing the sequence of data samples.

70. (original) The receiver subsystem of claim 61, wherein at least a portion of the nulling samples are weighted according to one or more weighting factors.

71. (original) An impulse radio receiver subsystem for reducing potential interference, comprising:

a data sampler adapted to sample a received signal at a sequence of data sample times to produce a sequence of data samples;

a first accumulator adapted to repeatedly accumulate N data samples of the plurality of data samples to produce a group of accumulated data sample, wherein N is an integer greater than one;

a nulling sampler adapted to sample the received signal at a time offset from each of the data sample times to produce a nulling sample corresponding to each of the data samples, thereby producing a sequence of nulling samples corresponding to the time offset;

a second accumulator adapted to repeatedly accumulate N nulling samples of the sequence of nulling samples to produce a group of accumulated nulling samples;

a combiner adapted to combine accumulated data samples in the group of accumulated data samples with corresponding accumulated nulling samples in the group of accumulated nulling samples to produce a group of adjusted accumulated samples;

a first quality metric generator adapted to determine a first quality metric associated with the group of adjusted accumulated samples;

a second quality metric generator adapted to determine a second quality metric associated with the group of accumulated data samples; and

a selector adapted to select either the group of adjusted accumulated samples or the group of accumulated data samples, based on the first and second quality metrics.

72. (original) An impulse radio receiver subsystem for reducing potential interference, comprising:

a data sampler adapted to sample a received signal at data sampling times to produce a sequence of data samples;

a nulling sampler adapted to sample the received signal at a time offset from each of the data sample times to produce a sequence of nulling samples; and

a combiner adapted to separately combine each of the data samples with a corresponding nulling sample from the sequence of nulling samples to produce a sequence of adjusted samples.

73. (currently amended) The receiver subsystem of claim 72, further comprising ~~the step of:~~ a demodulator to demodulate the adjusted sequence of samples.

74. (original) The receiver subsystem of claim 72, further comprising an interference analyzer to determine the time offset.

75. (original) An impulse radio receiver subsystem adapted to improve an impulse signal-to-interference ratio of received signals, comprising:

an interference analyzer to search for and select a preferred time offset;

a data sampler adapted to sample a sequence of impulses of a received signal at data sampling times to produce a sequence of data samples;

a nulling sampler adapted to sample the received signal at the preferred time offset from each of the data sample times to produce a sequence of nulling samples; and

a combiner adapted to separately combine each of the data samples with a corresponding nulling sample from the sequence of nulling samples to produce a sequence of adjusted samples,

wherein the sequence of adjusted samples are used for further signal processing.

76. (original) The receiver subsystem of claim 75, wherein the interference analyzer comprises:

a further data sampler adapted to sample a sequence of impulses of a received signal at data sample times to produce a sequence of data samples;

a plurality of further nulling samplers adapted to sample the received signal at a plurality of time offsets from each of the data sample times to produce a plurality of nulling samples corresponding to each of the data samples, thereby producing a separate sequence of nulling samples for each of the time offsets;

a plurality of combiners adapted to separately combine each of the data samples with a corresponding nulling sample from each of the separate sequences of nulling samples to produce a separate sequence of adjusted samples corresponding to each of the time offsets;

a plurality of quality metric generators to produce a separate quality metric for each of the separate sequences of adjusted samples; and

a selector adapted to select one of the plurality of time offsets as the preferred time offset based on the quality metrics determined by the plurality of quality metric generators.

77. (original) The receiver subsystem of claim 76, where the sequence of impulses sampled by the plurality of further data samplers of the interference analyzer are received earlier in time than the sequence of impulse sampled by the data sampler.

78. (original) The receiver subsystem of claim 76, wherein the sequence of impulses sampled by the plurality of further data samplers of the interference analyzer are the same sequence of impulses sampled by the data sampler.

79. (original) The receiver subsystem of claim 78, wherein the further data sampler comprises the data sampler.

80. (original) The receiver subsystem of claim 75, wherein the interference analyzer comprises:

a further data sampler adapted to sample a sequence of impulses of a received signal at data sample times to produce a sequence of data samples;

a further nulling sampler adapted to sample the received signal at a time offset from the data sampling times to produce a nulling sample corresponding to each data sample;

a combiner adapted to separately combine each of the data samples with the corresponding nulling sample to produce a sequence of adjusted samples corresponding to the time offset;

a quality metric generator adapted to produce a quality metric based on the sequence of adjusted samples, wherein as the time offset is varied over time, the quality metric generator produces a plurality of quality metrics each associated with a separate time offset; and

a selector adapted to select the preferred time offset based on the quality metrics determined by the quality metric generator.

81. (original) The receiver subsystem of claim 80, where the sequence of impulses sampled by the further data sampler of the interference analyzer are received earlier in time than the sequence of impulse sampled by the data sampler.

82. (original) The receiver subsystem of claim 80, wherein the sequence of impulses sampled by the further data sampler of the interference analyzer are the same sequence of impulses sampled by the data sampler.

83. (original) The receiver subsystem of claim 82, wherein the further data sampler comprises the data sampler.

84. (original) The receiver subsystem of claim 83, wherein the interference analyzer comprises:

a sampler adapted to sample an earlier received signal at sample times to produce a sequence of samples, wherein the earlier received signal does not include an impulse signal;

a plurality of further nulling samplers adapted to sample the received signal at a plurality of time offsets from each of the sample times to produce a plurality of nulling samples corresponding to each of the samples, thereby producing a separate sequence of nulling samples for each of the time offsets;

a plurality of combiners adapted to separately combine each of the samples with a corresponding nulling sample from each of the separate sequences of nulling samples to produce a separate sequence of adjusted samples corresponding to each of the time offsets;

a plurality of quality metric generators to produce a separate quality metric for each of the separate sequences of adjusted samples; and

a selector adapted to select one of the plurality of time offsets as the preferred time offset based on the quality metrics determined by the plurality of quality metric generators.

85. (original) The receiver subsystem of claim 84, wherein the sampler comprises the data sampler.

86. (original) The receiver subsystem of claim 85, wherein the interference analyzer comprises:

a sampler adapted to sample an earlier received signal at sample times to produce a sequence of samples, wherein the earlier received signal does not include an impulse signal;

a further nulling sampler adapted to sample the received signal at a time offset from the sampling times to produce a nulling sample corresponding to each sample;

a combiner adapted to separately combine each of the samples with the corresponding nulling sample to produce a sequence of adjusted samples corresponding to the time offset;

a quality metric generator adapted to produce a quality metric based on the sequence of adjusted samples, wherein as the time offset is varied over time, the quality metric generator produces a plurality of quality metrics each associated with a separate time offset; and

a selector adapted to select the preferred time offset based on the quality metrics determined by the quality metric generator.

87. (original) The receiver subsystem of claim 86, wherein the sampler comprises the data sampler.